05/07/01

POWERWARE® 5115

User's Guide

500–1400 VA

www.powerware.com

Class B EMC Statements

FCC Part 15

NOTE This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

ICES-003

This Class B Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement sur le matériel brouilleur du Canada.

Requesting a Declaration of Conformity

Units that are labeled with a CE mark comply with the following harmonic standards and EU directives:

- Harmonic Standards: EN 50091-1-1 and EN 50091-2
- EU Directives: 73/23/EEC, Council Directive on equipment designed for use within certain voltage limits
  93/68/EEC, Amending Directive 73/23/EEC
  89/336/EEC, Council Directive relating to electromagnetic compatibility
  92/31/EEC, Amending Directive 89/336/EEC relating to EMC

The EC Declaration of Conformity is available upon request for products with a CE mark. For copies of the EC Declaration of Conformity, contact:

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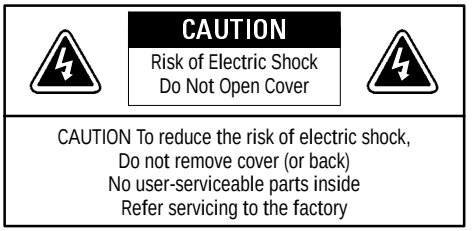
Special Symbols

The following are examples of symbols used on the UPS to alert you to important information:


CAUTION
Risk of Electric Shock
Do Not Open Cover
CAUTION To reduce the risk of electric shock,
Do not remove cover (or back)
No user-serviceable parts inside
Refer servicing to the factory

RISK OF ELECTRIC SHOCK - Indicates that a risk of electric shock is present and the associated warning should be observed.

CAUTION: REFER TO OPERATOR'S MANUAL - Refer to your operator's manual for additional information, such as important operating and maintenance instructions.

SAFETY EARTHING TERMINAL - Indicates the primary safety ground.

LOAD ON/OFF - Press the button with this symbol to energize the output receptacles (~ indicator illuminates) or to de-energize the output receptacles (~ indicator is off).

RJ-45 RECEPTACLE - For 230V units only: this receptacle provides network interface connections. Do not plug telephone or telecommunications equipment into this receptacle.

This symbol indicates that you should not discard the UPS or the UPS batteries in the trash. The UPS may contain sealed, lead-acid batteries. Batteries must be recycled.

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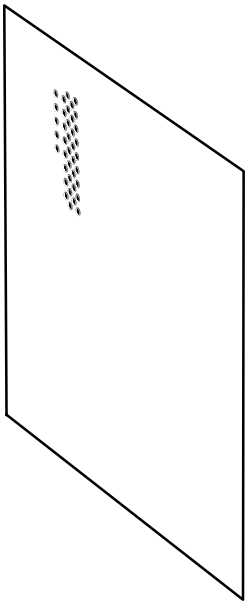
CHAPTER 1

POWERWARE 5115 – ONE OF THE BEST!

The Powerware® 5115 uninterruptible power system (UPS) protects your sensitive electronic equipment from basic power problems such as power failures, power sags, power surges, brownouts, and line noise.

Power outages can occur when you least expect it and power quality can be erratic. These power problems have the potential to corrupt critical data, destroy unsaved work sessions, and damage hardware — causing hours of lost productivity and expensive repairs.

With the Powerware 5115, you can safely eliminate the effects of power disturbances and guard the integrity of your equipment. The Powerware 5115's flexibility to handle an array of network devices makes it the perfect choice to protect your LANs, servers, workstations, and other electrical equipment.



Because an integral part of power protection is power management software, the Powerware 5115 comes fully equipped with a communication port, serial cable, and a CD containing both LanSafe III for networked systems and FailSafe III for standalone systems.

Providing outstanding performance and reliability, the Powerware 5115's unique benefits include the following:

- Advanced Battery Management (ABM™) doubles battery service life, optimizes recharge time, and provides advanced warning before the end of battery life.
- Buck and Boost voltage regulation ensures consistent voltage to your load by correcting voltage fluctuations.
- Hot-swappable batteries simplify maintenance by allowing you to replace batteries safely without powering down the critical load.
- Network Transient Protector guards your modem, fax machine, and other network communications equipment from surges.
- Start-on-battery capability allows you to power up the UPS even if utility power is not available.
- The Powerware 5115 is backed by worldwide agency approvals.

CHAPTER 2

INSTALLATION

This section explains:

- Equipment inspection
- Safety precautions
- UPS installation
- UPS rear panels

Inspecting the Equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

Safety Precautions

Read the following precautions before you install the UPS.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important instructions that you should follow during installation and maintenance of the UPS and batteries. Please read all instructions before operating the equipment and save this manual for future reference.

WARNING

- This UPS contains its own energy source (batteries). The output receptacles may carry live voltage even when the UPS is not connected to an AC supply.
- Do not remove or unplug the input cord when the UPS is turned on. This removes the safety ground from the UPS and the equipment connected to the UPS.
- To reduce the risk of fire or electric shock, install this UPS in a temperature and humidity controlled, indoor environment, free of conductive contaminants. Ambient temperature must not exceed 40°C (104°F). Do not operate near water or excessive humidity (95% max).
- To comply with international standards, the sum of earth leakage current from the load connected to the UPS must not exceed 1.5 mA.

Installing the UPS

The following steps explain how to install the UPS. Figure 2 shows a typical installation only. See "UPS Rear Panels" on page 6 for the rear panel of each model.

1. If you are installing power management software, connect your computer to the UPS communication port using the supplied communication cable.

NOTE If you need to change the factory-set defaults for the output voltage or input voltage range, see "Voltage Configuration" on page 13 before installing the UPS.

2. On 230V models, plug the power cord into the input connector on the UPS rear panel.

   Customer-supplied power cords must be correctly rated for the UPS (see "Specifications" on page 23). You can also use the power cord from the largest load if it is correctly rated.

NOTE

This is a typical setup; your setup may vary.

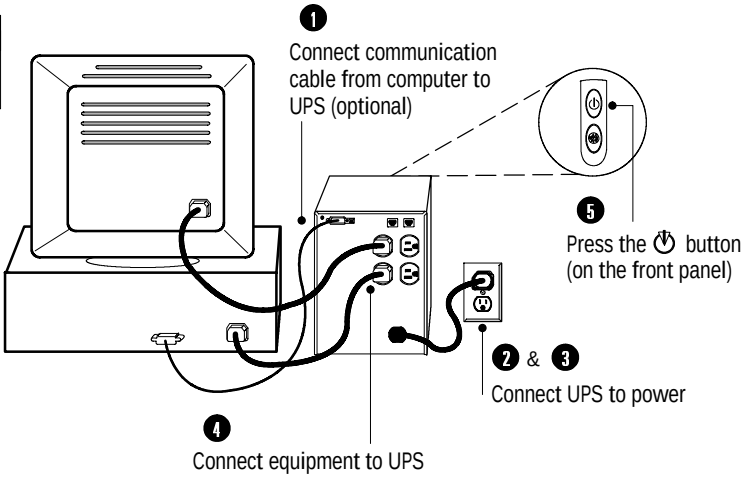


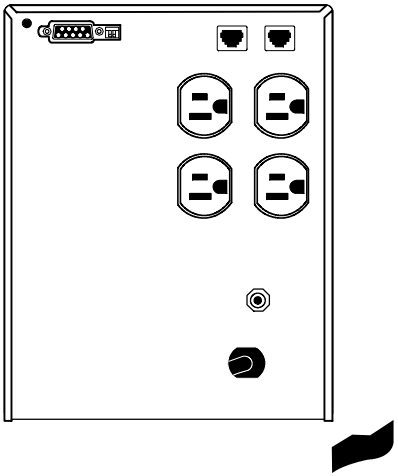
Figure 2. Typical UPS Installation (120V Model Shown)

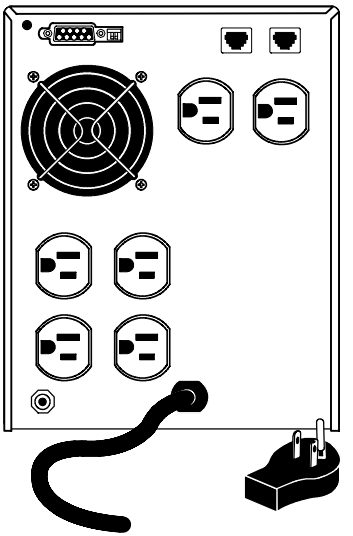
3. Plug the UPS power cord into a power outlet.
4. Plug the equipment to be protected into the UPS output receptacles.

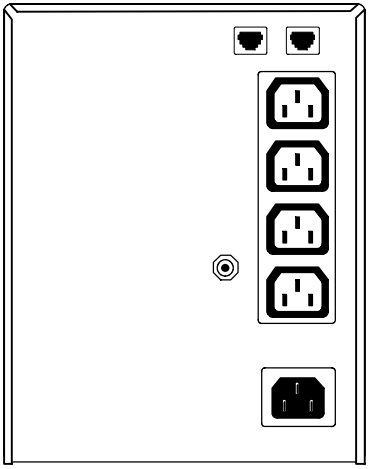
   DO NOT protect laser printers with the UPS because of the exceptionally high power requirements of the heating elements.
5. Start the UPS by pressing the ●

UPS Rear Panels

This section shows the rear panels of the Powerware 5115 models.







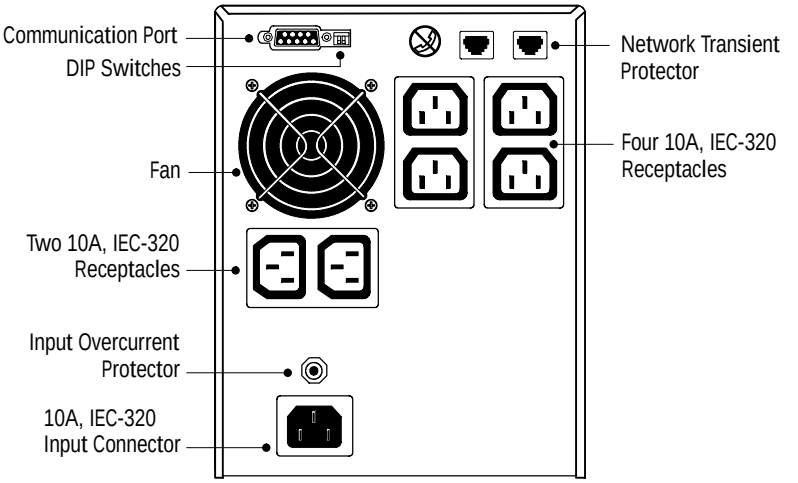


Figure 9. 1000 VA, 230V Rear Panel

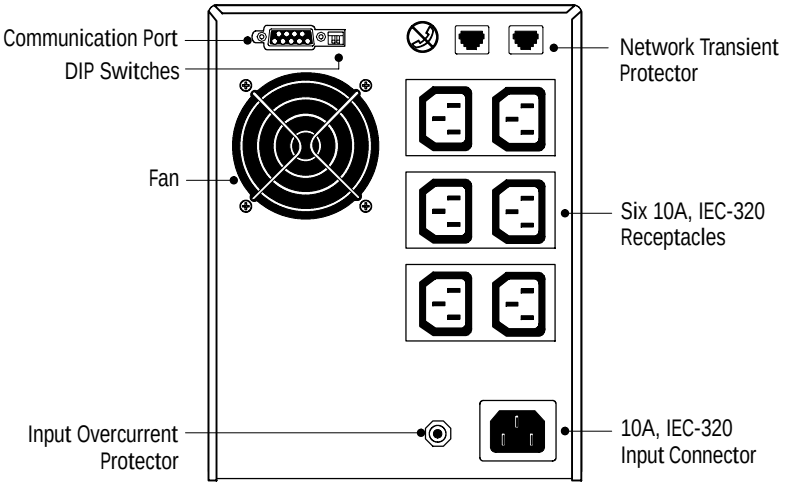


Figure 10. 1400 VA, 230V Rear Panel

CHAPTER 3

OPERATION

This section describes:

- Turning the UPS on and off
- Starting the UPS on battery
- Standby mode
- The UPS front panel and LEDs
- Initiating the self-test

Turning the UPS On

To turn on the UPS, press the ⏻ button on the front panel (shown in Figure 11). After the UPS is turned on, it conducts a self-test and enters Normal mode. The ~ indicator illuminates indicating that power is available from the UPS output receptacles.

Starting the UPS on Battery

To turn on the UPS without using utility power, press and hold the ⏻ button for two seconds. When the UPS starts on battery, it does not conduct a self-test to conserve battery power.

NOTE The UPS does not auto-detect the input frequency when starting on battery; the default is the last frequency used by the UPS.

Turning the UPS Off

To turn off the UPS, press the ⏻ button on the front panel and then unplug the UPS from the power outlet. If you do not unplug the UPS, it remains in Standby mode.

Standby Mode

When the UPS is turned off and remains plugged into a power outlet, the UPS is in Standby mode. The battery recharges when necessary and the ~ indicator is off, indicating that power is not available from the UPS output receptacles.

UPS Front Panel

The UPS front panel indicates the UPS status and also identifies potential power problems. Figure 11 shows the UPS front panel indicators and controls.

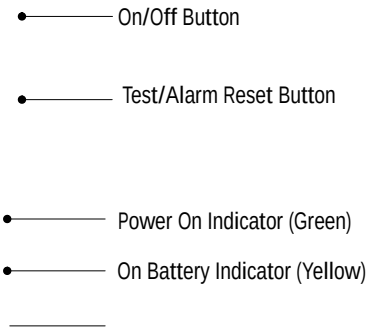


Table 1. DIP Switch Settings

120V Models			
Output Voltage	Input Voltage Range	DIP Switch 1	DIP Switch 2
110V	99V-116V	ON	OFF/ON
120V*	108V–127V*	OFF	OFF/ON
230V Models			
Output Voltage	Input Voltage Range	DIP Switch 1	DIP Switch 2
220V	198V–233V	ON	OFF
230V*	207V–243V*	OFF	OFF/ON
240V	216V–254V	ON	ON

*Default position

Communication Port

To establish communication between the UPS and a computer, connect your computer to the UPS communication port using the supplied communication cable.

When the communication cable is installed, power management software can exchange data with the UPS. The software polls the UPS for detailed information on the status of the power environment. If a power emergency occurs, the software initiates the saving of all data and an orderly shutdown of the equipment.

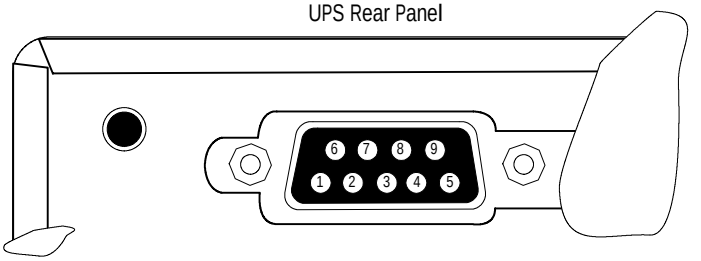


Figure 13. Communication Port

Table 2. Communication Port Pin Assignment

Pin Number	Signal Name	Function	Direction from the UPS
1	Low Batt	Low Battery relay contact; 20 mA, 30 Vdc contact rating	Out
2	RxD	Transmit to external device	Out
3	TxD	Receive from external device	In
4	DTR	PnP (Plug and Play) from external device (tied to Pin 6)	In
5	GND	Signal common (tied to chassis)	—
6	DSR	To external device (tied to Pin 4)	Out
7	—	No Connection	—
8	AC Fail	AC Fail relay contact; 20 mA, 30 Vdc contact rating	Out
9	Power Source	+V (8 to 24 volts DC power)	Out

Network Transient Protector

The Network Transient Protector, shown in Figure 14, is located on the rear panel and has jacks labeled IN and OUT. This feature accommodates a single RJ-45 (10BaseT) network connector.

Low voltage models can also accommodate an RJ-11 telephone connector that provides protection for modems, fax machines, or other telecommunications equipment. As with most modem equipment, it is not advisable to use this jack in digital PBX (Private Branch Exchange) environments.

Connect the input connector of the equipment you are protecting to the jack labeled IN. Connect the output connector to the jack labeled OUT.

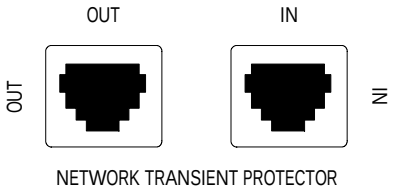


Figure 14. Network Transient Protector

CHAPTER 5

UPS MAINTENANCE

This section explains how to:

- Care for the UPS and batteries
- Replace the batteries
- Test new batteries
- Recycle used batteries

UPS and Battery Care

For the best preventive maintenance, keep the area around the UPS clean and dust-free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner.

For full battery life, keep the UPS at an ambient temperature of 25°C (77°F).

Storing the UPS and Batteries

If you store the UPS for a long period, recharge the battery every 6 months by plugging the UPS into a power outlet. The batteries charge to 90% capacity in approximately 3 hours. However, it is recommended that the batteries charge for 6 to 24 hours after long-term storage.

Replacing Batteries

The hot-swappable battery feature allows you to replace the UPS batteries easily without turning the UPS off or disconnecting the load.

If you prefer to remove input power to change the battery, press the ⏻ button and then unplug the UPS.

Consider all warnings, cautions, and notes before replacing batteries.

WARNING

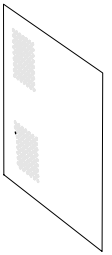
- Batteries can present a risk of electrical shock or burn from high short circuit current. The following precautions should be observed: 1) Remove watches, rings, or other metal objects; 2) Use tools with insulated handles; 3) Do not lay tools or metal parts on top of batteries.
- ELECTRIC ENERGY HAZARD. Do not attempt to alter any battery wiring or connectors. Attempting to alter wiring can cause injury.
- Replace batteries with the same number and type of batteries as originally installed in the UPS.
- DO NOT DISCONNECT the batteries while the UPS is in Battery mode.

CAUTION

Pull the battery out onto a flat, stable surface. The battery is unsupported when you pull it out of the UPS.

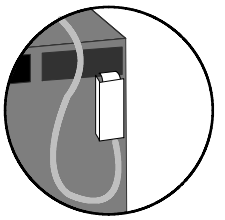
Use the following steps to replace the batteries:

1. Pull the top left corner forward and remove the front panel.

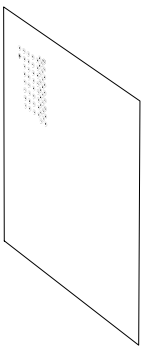


4. **750–1400 VA units.** Disconnect the red battery cable and then pull the battery out onto a flat, stable surface. Disconnect the black battery cable to the UPS as shown.

750/1000 VA



1400 VA



5. Replace the battery. See “Recycling the Used Battery” for proper disposal.
6. Connect the black battery cable to the new battery and then connect the red battery cable.
7. Reinstall the battery.
8. Reinstall the metal battery cover and front panel.

Testing New Batteries

NOTE It is recommended that the batteries charge for 6 to 24 hours before testing.

Press and hold the button for three seconds to initiate a self-test. The 15-second test automatically distributes the load to the batteries and tests the battery's performance. While the test is in progress, the indicators cycle through and the alarm sounds. When complete, the UPS returns to Normal mode as indicated by the ~ indicator.

If there is a problem with the battery, the alarm beeps, the indicator illuminates and the indicator flashes. Check the battery connections and be sure the battery is fully charged. Call your service representative if the problem persists.

Recycling the Used Battery

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery.

WARNING

- Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

CAUTION

Do not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information, contact your local recycling or hazardous waste center.

CHAPTER 6
SPECIFICATIONS

This section provides the following specifications for the Powerware 5115 models:

- Weights and dimensions
- Electrical input and output
- Environmental and safety
- Battery

Table 3. Model List and Mechanical

	120V Models	230V Models
UPS Models	PW5115 500 PW5115 750 PW5115 1000 PW5115 1400	PW5115 500i PW5115 750i PW5115 1000i PW5115 1400i
UPS Dimensions (WxHxD)	500 VA: 15.0 x 19.3 x 27.0 cm (5.9″ x 7.6″ x 10.6″) 750–1000 VA: 15.0 x 19.3 x 33.5 cm (5.9″ x 7.6″ x 13.2″) 1400 VA: 15.0 x 19.3 x 39.0 cm (5.9″ x 7.6″ x 15.4″)	
UPS Weight	500 VA: 7.8 kg (17.2 lb) 750 VA: 12.4 kg (27.3 lb) 1000 VA: 12.6 kg (27.8 lb) 1400 VA: 16.8 kg (37.0 lb)	

Table 4. Electrical Input

	120V Models	230V Models
Nominal Voltage	110V, 120V selectable	220V, 230V, 240V selectable
Voltage Range	±20% for nominal voltage at full load	
Nominal Frequency	45–65 Hz, 50/60 Hz auto-sensing	
Efficiency (Normal mode)	95%	
Noise Filtering	Full-time EMI/RFI filtering	
Overcurrent Protection	Resettable input overcurrent protector	
Connections	6-ft, 5-15P power cord (90° angle)	10A, IEC-320 input connector

Table 5. Electrical Output

	120V Models	230V Models
Power Levels (rated at nominal inputs)	500 VA, 320W 750 VA, 500W 1000 VA, 670W 1400 VA, 950W	
Power Factor	500 VA, 0.64 750–1400 VA, 0.67	
Regulation (Normal mode)	-10% to +6% of nominal voltage	
Regulation (Battery mode), Nominal Voltage ±5%	Same as selected nominal input voltage 110, 120V	Same as selected nominal input voltage 220, 230, 240V
Voltage Waveform	Sine wave	
Overcurrent Protection	Inverter saturation current limited	
Output Receptacles	500–750 VA: (4) 5-15 1000–1400 VA: (6) 5-15	500–750 VA: (4) 10A, IEC-320 1000–1400 VA: (6) 10A, IEC-320

Table 6. Environmental and Safety

	120V Models	230V Models
Operating Temperature	Up to 1,500 meters: 0°C to 40°C (32°F to 104°F); UL tested 25°C (77°F) Above 1,500 meters: 0°C to 35°C (32°F to 95°F)	
Transit/Storage Temperature	-15°C to 55°C (5°F to 131°F)	
Relative Humidity	5–95% noncondensing	
Operating Altitude	Up to 3,000 meters above sea level	
Audible Noise	Less than 45 dBA typical	
Surge Suppression	ANSI C62.41 Category A (formerly IEEE 587)	
Safety Conformance	UL 1778; UL 497A; CAN/CSA C22.2, No. 107.1	UL 1778, UL 497A (data line only); CAN/CSA C22.2, No. 107.1; EN 50091-1-1 and IEC 60950
Safety Markings	UL, cUL	UL, cUL, CE, TUV, C-Tick
EMC (Class B)	FCC Part 15, ICES-003	EN 50091-2, FCC Part 15, ICES-003

Table 7. Battery

Configuration	500 VA: (1) 12V, 9 Ah internal battery 750 VA: (2) 12V, 7.2 Ah internal batteries 1000 VA: (2) 12V, 9 Ah internal batteries 1400 VA: (3) 12V, 9 Ah internal batteries
Voltage	500 VA: 12 Vdc 750–1000 VA: 24 Vdc 1400 VA: 36 Vdc
Type	Sealed, maintenance-free, valve-regulated, lead-acid
Charging	Advanced charging for faster recovery; less than 3 hours to 90% usable capacity at nominal line and no supplementary power supply load
Monitoring	Advanced monitoring for earlier failure detection and warning

Table 8. Battery Run Times (in Minutes)

		UPS Models by VA Ratings			
Load (VA)	Watts	500	750	1000	1400
200	128	17	38	41	58
300	192	11	27	28	41
500	320	5	14	15	28
600	402		9	10	19
750	503		6	8	14
900	603			6	10
1000	670			5	8
1200	804				6
1400	938				5

NOTE Battery times are approximate and may vary depending on the load configuration and battery charge.

CHAPTER 7

TROUBLESHOOTING

This section explains:

- Site wiring fault on 120V models
- UPS alarms and conditions
- How to silence an alarm
- Service and support

Site Wiring Fault (120V Models Only)

The Site Wiring Fault indicator on the UPS rear panel illuminates if the ground wire connection does not exist or the line and neutral wires are reversed in the line receptacle. This indicator stays on until the condition is resolved. Have a qualified electrician correct the wiring fault. The UPS operates when the indicator is illuminated, but does not provide rated noise and surge suppression.

Audible Alarms and UPS Conditions

The UPS has an audible alarm feature to alert you of potential power problems. When the alarm is activated, the UPS beeps in different intervals according to a particular condition. Use Table 9 to determine and resolve the UPS alarms and conditions.

Silencing an Audible Alarm

To silence the alarm for an existing fault, press the button. If UPS status changes, the alarm beeps, overriding the previous alarm silencing. The alarm does not silence if there is a UPS fault, low battery condition, or if the battery needs to be replaced.

Indicator Legend

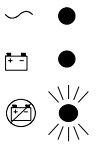
○ Unlit

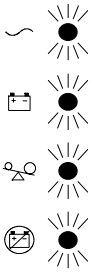
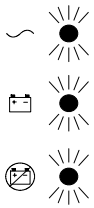
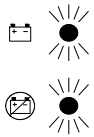
● Lit

Flashing

Table 9. Troubleshooting

Alarm or Condition	Possible Cause	Action
The ~ indicator is not on; the UPS does not start.	The power cord is not connected.	Check the power cord connections.
	The wall outlet is faulty.	Have a qualified electrician test and repair the outlet.
The UPS operates in Battery mode only, even though normal utility power is present.	The input overcurrent protector is open.	Save your work and turn off your equipment. Turn off the UPS. Reduce the load, then press the input overcurrent protector on the UPS rear panel.
UPS does not provide the expected backup time.	The battery may be fully discharged because of: • long-term storage • frequent power outages • end of battery life	Plug the UPS into a power outlet for 24 hours to charge the battery. Press the button, if the alarm beeps, see "Replacing Batteries" on page 18 to replace the battery. During extended power outages, turn off the UPS after saving your work and shutting down your computer to conserve battery charge.
~ ●	Normal operation.	None. The UPS is operating in Normal mode and automatically provides consistent voltage with the Buck and Boost feature.
1 beep every 4 seconds.	Utility power failure.	The UPS is powering your equipment with its internal battery. If this is an extended power outage, save your work and turn off your equipment to conserve battery power.
1 beep every 2 seconds.	The battery is running low.	2 minutes or less of battery power remains (depending on load and battery charge). Prepare for a shutdown. Save your work and turn off your equipment. The alarm cannot be silenced.

Alarm or Condition	Possible Cause	Action
1 beep every 2 seconds.	The UPS is running on battery power because the input voltage is too high or too low.	Correct the input voltage, if possible. The UPS continues to operate on battery until the condition is corrected or the battery is completely discharged. If the condition persists, the input voltage in your area may differ from the UPS nominal. Change the UPS input voltage to match your local voltage (see "Voltage Configuration" on page 13).
1 beep per second.	Power requirements exceed UPS capacity (overload is greater than 120%) or the load is defective.	The UPS will automatically shut down in 3 minutes. Save your work immediately and turn off your equipment. Turn off the UPS. Remove some of the equipment from the UPS. You may need to obtain a larger capacity UPS.
1 beep per second.	The UPS is on battery, and the power requirements exceed UPS capacity (overload is greater than 120%) or the load is defective.	Shutdown is imminent (30 seconds). Save your work and turn off your equipment. Turn off the UPS. Remove some of the equipment from the UPS. You may need to obtain a larger capacity UPS.
Continuous beep.	Battery test failed.	Check the battery connections and be sure the battery is fully charged. If the indicator still flashes, see "UPS Maintenance" on page 17 to replace the battery. Call your service representative if the problem persists.
 Continuous beep.	UPS internal temperature is too high.	Shutdown is imminent. Save your work and turn off your equipment. Turn off the UPS. Clear vents and remove any heat sources. Ensure the airflow around the UPS is not restricted. Wait at least 5 minutes and restart the UPS. If the condition persists, contact your service representative.
Continuous beep.		

Alarm or Condition	Possible Cause	Action
 3 beeps every 10 seconds.	Failed attempt to start the UPS on battery.	Plug the UPS into a power outlet for 24 hours to charge the battery. After charging the battery, press and hold the button for 3 seconds; then check the indicator. If the indicator still flashes, see "UPS Maintenance" on page 17 to replace the battery.
 Continuous beep.	The output wave is abnormal while the UPS is on battery.	Shutdown is imminent. Save your work and turn off your equipment. Turn off the UPS. Contact your service representative.
 Continuous beep.	The output voltage is below or above the limit while the UPS is on battery.	Save your work and turn off your equipment. Turn off the UPS. Contact your service representative.

Service and Support

If you have any questions or problems with the UPS, call your **Local Distributor** or the **Help Desk** at one of the following telephone numbers and ask for a UPS technical representative.

In the United States	**1-800-365-4892**
In Canada	**1-800-461-9166**
All other countries	**1-919-870-3149**

Please have the following information ready when you call the Help Desk:

- Model number
- Serial number
- Version number (if available)
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from the Help Desk or distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, freight prepaid for all warrantied units.

NOTE For critical applications, immediate replacement may be available. Call the **Help Desk** for the dealer or distributor nearest you.